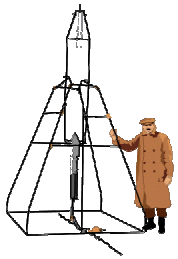
Earth Science Vision

- In 1998 the NASA Administrator challenged GSFC to create a 20 year Earth science vision.
- The draft vision has been evolving for the past 9 months.
- Target completion is June 15 - products are the vision, an economic analysis, and supporting technology roadmaps.
- In support of the technology product, a roadmap workshop was held April 20-21 in Silver Spring, Maryland.
  - The raw workshop output is currently being cleaned up.
  - This output will be used to develop a long-term technology strategy and to develop budget requirements.



The Earth Science Vision: Technology Concepts

Advanced Sensors

- Advanced Detectors
- Improved Aperture
- Programmable On-Board Processing

Sensor Webs

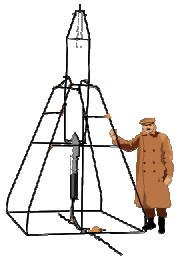
- Miniaturized Observatories
- Reconfigurable Formations
- Multiple Vantage Points
- “Smart” Sensor Systems

Access To Knowledge

- Fast Petabyte Storage
- Mining/Data Fusion
- Data Prospecting
- Data Visualization

Information Synthesis

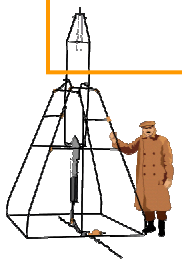
- Adaptive Information Processing
- Highly Parallel Computing
- Model-Directed Sensor Operations
- Intelligent Science Algorithms



Advanced Sensors

Vision

- 10-day skilled weather forecasts
- Short-range climate forecasts
- Long-range environmental forecasts
- Air quality
- Natural hazards



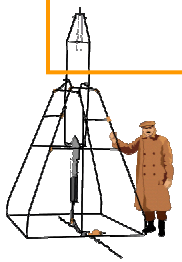
Technology Roadmaps

- Advanced Detectors
  - Detectors & Read Out Electronics
  - Coolers
  - Warm Focal Plane Arrays
- Improved Apertures
  - Optical
    - Large Deployable Systems: Ultra-high Resolution Imaging
    - Large Ultra-lightweight Deployable Structures
    - Tunable LIDAR
  - Microwave
    - Passive
    - Active
- Programmable On-Board Processing
  - Computing Capability
  - Increased Storage
  - High Bandwidth Communications

Sensor webs

Vision

- 10-day skilled weather forecasts
- Short-range climate forecasts
- Long-range environmental forecasts
- Air quality
- Natural hazards



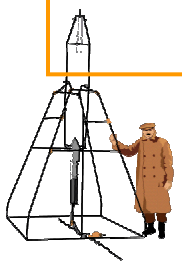
Technology Roadmaps

- Miniaturized Observatories
  - MEMS
  - Multi-Functional Structures
  - Nano-Sats
- Reconfigurable Formations
  - Formation Flying
  - Interferometry
  - Virtual Platforms/Advanced Sensorwebs
- Vantage Point Trades
- Embedded Intelligence
  - Intelligent Web
  - Sensor and Platform Autonomy Dynamic Recognition and Tasking
  - Inter-Platform Communications
  - Standard Protocols

Information Synthesis

Vision

- 10-day skilled weather forecasts
- Short-range climate forecasts
- Long-range environmental forecasts
- Air quality
- Natural hazards



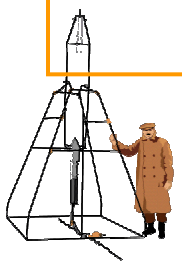
Technology Roadmaps

- Adaptive Information Processing
  - Highly Connected Systems
  - Distributed, Reconfigurable Computing
  - Model-Directed Sensor Operations
  - Intelligent Science Algorithms
  - Intelligent Agents
- Model Integration (Highly Interactive Coupled Atmospheric, Ocean, Land & Solid Earth Models)
  - Highly Parallel Data Processing
  - Real-Time Integration of Observations & Models

Access to Knowledge

Vision

- 10-day skilled weather forecasts
- Short-range climate forecasts
- Long-range environmental forecasts
- Air quality
- Natural hazards



Technology Roadmaps

- Timely Information
  - Rapid Distribution of Data Products
- Access to Data
  - Advanced Search Engines
  - Next Generation Data Manipulation Tools
  - Mining/Data Fusion
  - Data Prospecting
  - Immersive Environments
- Data Exploitation
  - Information Extraction/Presentation
  - Data Visualization
  - The “Internet” Model